wasps. A series of tables and diagrams helps to explain variation in some of the individual behavioral components. This chapter concludes with a definition of ancestral and derived behavioral characteristics within the subfamily Philanthinae and a flow chart that depicts aspects of the evolution of male and female behavior in digger wasps.

This is a highly organized, well-written, easily readable book detailing the individual behavioral components of males and females of the sphecid genus *Philanthus.* It approaches the subject from the standpoint of evolution of behavior in digger wasps and is synthetic in scope, tying together a myriad of significant information ranging from scent marking, alternative mating strategies and body-size related to success in mating in males to construction of false burrows, nest aggregation and counter-cleptoparasitic behavior in females. Anyone with an interest in descriptive and evolutionary behavior, behavioral ecology or natural history will want to purchase, read and place this very informative and highly interesting book on their shelf.—*Frank E. Kurczewski, Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, Syracuse, New York 13210.*

LITERATURE CITED

Evans, H. E. 1957. Studies on the Comparative Ethology of Digger Wasps of the Genus *Bembix.* Comstock Publ. Assoc., Ithaca, New York, vii + 248 pp.

Evans, H. E. 1966. The Comparative Ethology and Evolution of the Sand Wasps. Harvard Univ. Press, Cambridge, Massachusetts, xvi + 526 pp.

Mostly Flies

J. New York Entomol. Soc. 96(4):489–491, 1988

A Manual of Forensic Entomology.—Kenneth G. V. Smith. 1986. British Museum (Natural History) and Cornell University Press, 205 pp. $39.95.

Smith has written an engaging and very readable primer on forensic entomology—the first in English. The aim of the author is to simplify complex material and to serve those with only an elementary knowledge of entomology. He succeeds with a style that is direct, engaging and lucid, perhaps best exemplified in the keys to the mainly European insect fauna found on corpses and the excellent diagnostic drawings. The book has chapters on the faunal succession on cadavers, methods and techniques, case histories, keys and illustrations of relevant Diptera species, and illustrations of species of Coleoptera, Hemiptera, Lepidoptera, etc., and even of Cannabis insects. The glossary is a useful adjunct.

One might conclude from a first reading that with an elementary knowledge of entomology and this manual, an individual would be ready to tackle homicide cases. Nothing could be farther from the truth. Indeed, a little knowledge could be a dangerous thing. Forensic entomology is a specialist field. It should not be practiced by persons with only an "elementary knowledge of entomology," especially when lives may be at stake, as in homicide cases. The following will serve to illustrate some of the complexities involved and sophistication required.

Faunal successions on carcasses do not operate like clockwork and the longer out one goes the less precise become the schedules of arrivals and departures. Uncritical reliance on successional data to pinpoint the postmortem interval could result in significant error. Furthermore, one cannot automatically transpose successional data from lizards, guinea pigs, dogs, cats, rabbits, pigs, etc. to human corpses. The difference in biomass alone could alter the picture, to say nothing of the interactions with abiotic factors e.g., temperature, wind, rain and/or ground moisture, and sun/shade. Table 4 is taken from Nuorteva (1977) and is a case in point. The table presents data on the duration of development of some blow flies in fish in the field in Finland. The following factors which could influence the rate of development are not given.

1. Amount of fish. This constrains the number of maggots. A large maggot mass would elevate the temperature and accelerate maggot development. Possible drying out of the fish could prolong larval development.

2. Temperature. Only the mean temperature from a meteorological station at an unspecified distance is given. The real temperature history of the maggots in the field is unknown. Would we be justified in transposing the data in this table to a case involving a human homicide? I think not.

It will be confusing to the novice to find that Table 5 gives egg–adult development time of *Calliphora vomitoria* as 21 to 27 days while Table 6 gives it as 12 to 13 days. Table 6 does not give a rearing temperature while Table 5 does. This is a small but significant omission because developmental rates are temperature driven. Table 5 is taken from Kamal (1958) and the modes for most species do not add up to the totals that are given. Some experienced dipterists have consulted Kamal's original dissertation and note that the reared flies in the photographs are only about one half to three quarters the size of wild flies in the same area. It is possible that the rearing media were allowed to dry out or the amounts were insufficient, thus prolonging the larval stage. Nuorteva (1977), unfortunately, includes the same table. One wonders in how many forensic cases the data in this table have been used.

Smith points out the importance of temperature in controlling oviposition and development of sarcosaprophagous insects and cites Reiter (1984) as follows: "He also found that constant temperatures over 30°C led to stunted forms which failed to pupate and died. . . ." Smith does not mention that this observation refers specifically to *Calliphora vicina*. The reader may conclude erroneously that this is true of blow flies generally, which it is not.

A few paragraphs later is the following statement. "Thus, on bodies found indoors one would normally expect to find *Calliphora*, but not *Lucilia* or *Sarcophaga* (unless all the windows were open and the body in bright sunlight)." I have found *P. sericata* larvae on bodies in these situations: pitch black bathroom; room with a northern exposure with windows closed and shades drawn; trunk of a car; and causing myiasis in patients in a screened hospital room and in a hospital ward without direct sunlight. The drive to oviposit will cause 'heliophilic' species to do strange things.

Two technical trivia. On p. 53, ". . . the third stage larva forms a puparium from its cast skin. . . ." Actually, the puparium is formed before the skin is cast and the skin is not cast until the larva (=prepupa) molts to the pupal stage. On p. 50, third line up from bottom: 231 ft = 6.5 m?

It is about 100 years since Megnin pioneered the field of forensic entomology by describing eight stages in the decomposition of a human corpse and the insects associated with each stage. Forensic entomology is still a young science and precisely for this reason it must maintain rigorous standards among its researchers and practitioners if it is to gain widespread acceptance. There is no substitute for good data, nor for well-trained entomologists to interpret and apply them. This book does a good job of opening the door but invites the wrong people in. 'Mathematics for the million' is fine, but maggots for the million won't hold up in court.—*Bernard Greenberg, Department of Biological Sciences, University of Illinois at Chicago, Chicago, Illinois 60680.*

LITERATURE CITED

Kamal, A. S. 1958. Comparative study of thirteen species of sarcosaprophagous Calliphoridae and Sarcophagidae (Diptera). I. Bionomics. Ann. Entomol. Soc. Am. 51:261–271.

Nuorteva, P. 1977. Sarcosaprophagous insects as forensic indicators. Pages 1072–1095 *in:* C. G. Tedeschi, W. G. Eckert and L. G. Tedeschi (eds.), Forensic Medicine, a Study in Trauma and Environmental Hazards. Vol. II. Physical Trauma. Saunders, Philadelphia.

Reiter, C. 1984. Zum Wachstumsverhalten der Maden der blauen Schmeissfliege *Calliphora vicina.* Zeit. Rechtsmedizin 91:295–308.